

Unpacking the Influence of Environmental Knowledge and Environmental Awareness on Green Tourism Consumption Intentions: A Moderated Mediation Model

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ABSTRACT

As mass tourism enters a new phase of comprehensive development, public awareness of sustainability and environmental protection is increasing. Consequently, low-carbon tourism has become a prominent consideration, with travelers progressively adopting more eco-friendly travel practices. This shift has led contemporary academic research and the direction of the modern tourism industry to focus on green tourism marketing. Utilizing the Theory of Responsible Environmental Behavior and the Attitude-Behavior-Context (ABC) theory, this research investigates how environmental knowledge and environmental awareness influence tourists' willingness to participate in green consumption, as well as the underlying mechanisms in the context of high-quality cultural tourism development. We particularly examine the moderating roles of tourism destination image and green information presentation as critical contextual factors. Furthermore, we provide policy recommendations for governments and enterprises, and strategies to encourage tourists' green purchasing intentions, considering the perspectives of government, businesses, and tourists.

KEYWORDS

Environmental knowledge; Environmental awareness; Green tourism consumption intention; Green information presentation; Tourism destination image

1 Introduction

With the continuous deepening of China's high-quality economic development strategy, the concept of a circular economy has gradually gained widespread recognition. Correspondingly, green consumption, as an emerging concept and mode of consumption, is increasingly embraced by the public. As an essential industry for green development, tourism is bound to adopt green tourism marketing as a central direction for modern industry growth. In the context of the mass tourism period, why do tourists possess "environmental knowledge" yet lack "environmental awareness," or exhibit "environmental awareness" without the inclination for "green tourism consumption"? In what ways might the tourism sector enhance tourists' propensity for sustainable consumption? This is a complex issue that requires attention and resolution from both academia and industry.

The propensity of customers to take sustainability and environmental considerations into account when making purchases of goods or services is known as "green consumption intention". Consumption attitudes and intentions will vary depending on the context, according to certain studies ^[1]. Qi Haifeng and others' study demonstrates that external situational elements are frequently a key reason why tourists say one thing but mean another when it comes to green consumption ^[2]. Over time, tourism businesses have also started to take steps to encourage travelers to practice green consumerism, such as using informational and educational tactics to influence and motivate travelers to be more environmentally conscious ^[3]. However, it is extremely challenging to convince consumers to practice "altruistic" green consumption ^[4]. Even if tourism businesses and government management departments have tried a few strategies, some of them are ineffective in encouraging people to consume more sustainably. Accordingly, the author thinks that investigating the process that influences travelers' inclination to consume green from the standpoint of environmental knowledge is both theoretically significant and practically enlightening. In light of the aforementioned factors, this study draws upon the theory of the Attitude-Behavior-Context Theory to introduce green information presentation and tourism destination image as moderating variables. The Heavenly Lake and Tianshan Mountains Scenic Area, a heritage tourist destination, is chosen as a case study to investigate the influence of consumers' environmental knowledge and awareness on tourists' willingness to engage in green consumption against the strategic backdrop of high-quality development of cultural tourism. This will help to strengthen the framework of factors influencing consumers' green consumption and offer management inspiration and useful advice for enhancing tourists' willingness to engage in green tourism.

2 Literature review and theoretical foundation

2.1 The relationship between environmental knowledge, environmental awareness and green tourism consumption intention

Environmental knowledge is typically characterized as an individual's or society's comprehension and acknowledgment of environmental information, concepts, principles, and facts. This knowledge includes information

regarding the natural environment, ecosystems, environmental challenges, sustainable development, and related factors, which may encourage consumers to convert this knowledge into a heightened awareness of environmental protection[5]. In general, knowledge is the experience of acts to come. Simultaneously, several academics have noted that consumers' intention to engage in green consumption will continue to be supported by the degree of environmental awareness in the consuming area ^[6]. People's environmental consciousness is growing along with their desire for a better living environment, and they are becoming more and more willing to use green products in their daily lives, including when it comes to social interaction, lifestyle, and shopping [7]. Environmental knowledge is becoming more widely known, and consumers are becoming more conscious of green consumption habits as ecological and environmental issues get worse. Given the intricate relationship between environmental cognition and behavior, it is crucial to distinguish between environmental knowledge and environmental awareness when examining the associations among environmental knowledge, environmental awareness, and green consumption intentions.

This study posits that visitors' environmental knowledge positively influences the evolution of their environmental awareness and the development of intentions for green tourism consumption, leading to the following hypothesis:

H1: Environmental knowledge positively influences the enhancement of tourists' environmental awareness.

H2: Environmental awareness positively influences travelers' inclination to engage in green tourism consumption.

Some environmental researchers noted that environmental awareness can also have an impact on an individual's ecological behavior, in addition to the critical function that environmental knowledge plays in the evolution of ecological behavior [8]. Environmental awareness is a personal conviction that influences customers to engage in eco-friendly practices. Individuals possessing environmental awareness typically exhibit a heightened moral sensibility, a robust sense of duty, along with various other attributes and attitudes.

In light of the unique circumstances surrounding green tourism, this study uses environmental awareness as a mediating factor. Environmental awareness refers to an individual's comprehensive understanding of the environment and its interplay with humanity and society. A constructive mindset fostered to attain sustainable development and environmental conservation. Studies indicate that cognitive aspects impact an individual's environmental awareness[9]. A person's comprehension of environmental issues, information-gathering skills, and awareness of environmental challenges are all components of cognitive awareness. People who are more cognizant may develop a more favorable attitude toward green consumerism, be more inclined to buy eco-friendly goods, and adopt eco-friendly practices.

As mentioned above, we claim that visitors' environmental knowledge increases their motivation to consume green by raising their environmental awareness during the tourism process, and we propose the following hypothesis:

H3: Environmental awareness has a beneficial impact on the green tourism consumption intention.

H4: Environmental awareness mediates the favorable influence of environmental knowledge on the green tourism consumption intention.

2.2 The moderating role of green information presentation

Concerns about social responsibility and environmental preservation also have a role in consumers' purchase intentions and choices, in addition to more conventional considerations like cost, functionality, and quality. Therefore, businesses are becoming more and more concerned with how to use green information presentation or presentation to affect consumers' intents and behaviors while making purchases. An advertising and marketing tactic known as "green information presentation" seeks to highlight the sustainability and environmental aspects of goods and services. Accurate environmental information helps customers better grasp the nature and attributes of products, which facilitates green buying decisions. Furthermore, this paper must address the topic of how much green information presentation will be beneficial in increasing customers' willingness to engage in green tourism. Information presentation, according to some academics, can help consumers grasp the meaning and importance of green consumption while also influencing their intention to engage in green consumption by stimulating their cognitive and affective processes[10]. Certain experts have demonstrated that information dissemination can favorably influence individuals' environmental consciousness. While some scientists contend that information publicity does not significantly influence the relationship between individual environmental awareness and green purchasing intention, the majority concur that a positive association exists between the two. Consequently, this study posits the subsequent research hypothesis:

H5: The presentation of green information moderates the influence of environmental knowledge on environmental awareness, hence amplifying the effect of visitors' environmental knowledge on their intention to engage in green tourism consumption.

2.3 The moderating role of the tourist destination image

The destination image is a fundamental idea in tourism marketing. It describes how visitors think, assess, and perceive a place, including their subjective perceptions and assessments of its social, cultural, natural, and other features[11]. The study conducted by Fan Jun demonstrates that the service image of a tourist site significantly influences tourists' environmental responsibility behavior via place attachment[12]. Research on the relationship between destination image

and green tourism consumption intention is still lacking[13], which makes it difficult to determine how these two factors are related. Upon examining the literature, it is concluded that the notion of tourist destination image embodies tourists' subjective perceptions, destination attributes, and various social, cultural, and environmental factors, which are crucial for cultivating a favorable tourist destination image, attracting visitors, and fostering the sustainable advancement of the tourism sector. When a tourist site effectively conveys a positive image of environmental stewardship, sustainable development, and social responsibility, tourists are more inclined to select the place for eco-tourism and appreciate the experience of coexisting with nature. Consequently, this study posits the following hypothesis:

H6: The tourist destination image moderates the influence of environmental awareness on green tourism consumption intention, thereby increasing the impact of tourists' environmental knowledge on green tourism consumption intention.

Based on the Attitude-Behavior-Context Theory, this paper introduces "environmental knowledge" as an antecedent variable to explore its mechanism and specific impact path on tourists' green consumption intention. Moreover, this study thoroughly examines the moderating effects of green information presentation and the image of tourist destinations within this influence pathway, aiming to furnish theoretical support for producers (stakeholders like tourist attractions) to adjust their production practices and to inspire relevant governmental agencies to develop appropriate policies for the tourism sector. Figure 1 illustrates the theoretical model of the investigation.

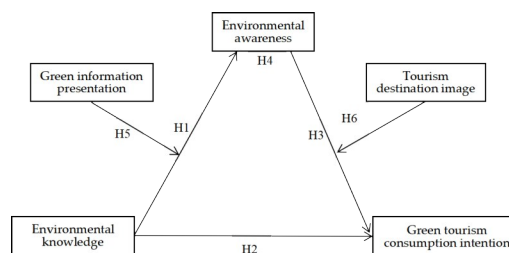


Figure1 Conceptual model

3 Methods

Based on the literature review and hypothesis, we propose the existence of a correlation among environmental knowledge, environmental awareness and green tourism consumption intention, while also examining the moderating effects of green information presentation and the image of tourist destinations.

3.1 Questionnaire design and sample selection

The design of the questionnaire primarily comprises three components. The initial section comprises a survey regarding tourists' travel characteristics and fundamental conditions, encompassing travel methods, trip frequency, green information presentation, perceptions of tourist destinations, and other essential factors; the subsequent section constitutes the core of the questionnaire, featuring three variable modules: tourists' environmental knowledge, environmental awareness, and willingness to engage in green tourism consumption, employing a Likert 5-point scale for evaluation; the final section surveys tourists' demographic characteristics, including gender, age, educational attainment, occupation, and monthly income. This paper designates the Heavenly Lake and Tianshan Mountains Scenic Area, a heritage tourism site, as a case study for examination and analysis. Between October and November 2024, the author administered 335 questionnaires in person and gathered online responses via Questionnaire Star. A total of 309 valid questionnaires were obtained, resulting in a valid questionnaire rate of 92.24%.

3.2 Principal attributes of consumers

The survey sample characteristics indicate that male visitors comprise 47.57% while female tourists account for 52.43%. The age distribution of the responses predominantly falls among the 29-39 and 40-49 age brackets, primarily comprising young and middle-aged individuals, which aligns with the characteristics of my country's outbound population. The educational qualifications of the sample group predominantly consist of undergraduate degrees (43.04%) and junior college diplomas (26.54%). Corporate employees and freelancers constitute a significant component of tourist occupations, comprising 37.22% and 21.36% of respondents, respectively.

4 Results

4.1 Analysis of the reliability and validity

The reliability test results of each variable show that the Cronbach's α coefficients of environmental knowledge, environmental awareness, green tourism consumption intention, green information presentation, and tourism destination image being 0.889, 0.842, 0.868, 0.872, and 0.873, respectively, all greater than 0.8. thereby demonstrating a

relatively high reliability level of the scale. The KMO value of the model is 0.876, which is very good. The approximate chi-square value of Bartlett's sphericity test is 3843.306, the degree of freedom is 231, the significance level is 0.000, and the average variance variation AVE value of each latent variable is greater than 0.5, and the composite reliability (CR) values of all constructs exceeded 0.7, indicating that the convergent validity of the model is ideal. This study employed AVE to assess the discriminant validity among variables. The comparison of Pearson correlation coefficients and the square roots of AVE among the five variables yielded the following results. The AVE exceeded 0.5, and the square roots of the AVE for all latent variables surpassed their correlation coefficients with other latent variables, demonstrating that the scale's discriminant validity was optimal.

4.2 Empirical calculation and hypothesis testing

4.2.1 Hypothesis testing results

The overall fitness of the set model was tested using the Amos 24.0 program. The findings indicated that the relative chi-square value in the model was (CMIN/DF) 2.838, the P value was significant, and the root mean square error of approximation (RMSEA) was 0.077, all of which conformed to the measurement criteria of the indicators. The absolute fitness index indicated a GFI of 0.942, surpassing the 0.9 threshold; the AGFI was 0.873, exceeding 0.8 and nearing 0.9, thus remaining within an acceptable range. Furthermore, the relative fit indices, CFI and NFI, were 0.942 and 0.914, respectively, both exceeding the 0.9 standard, signifying that the model exhibited a commendable degree of fit and a more rigorous structure.

The causal association between the variables is established based on the standardized path coefficient, standard error, critical ratio, and P value. The data presented in Table 1 indicate that the study hypotheses H1-H3 have been validated. Environmental knowledge (EK) substantially enhances environmental awareness (EA). For each unit increase in environmental knowledge, environmental awareness improves by 0.432 units. The more the consumer's proficiency in environmental knowledge, including environmental protection, sustainable development, and green development, the more pronounced their environmental awareness. With a standardized path coefficient of 0.424 between environmental awareness (EA) and green tourism consumption intention (GTCI), consumers are more likely to be willing to engage in green tourism when they are more conscious of environmental protection. The standardized path coefficient between environmental knowledge (EK) and green tourism consumption intention (GTCI) is 0.429. This means that tourists are more likely to be willing to engage in green tourism consumption behavior if they have a greater understanding and mastery of environmental knowledge. Additionally, consumers who agree with the concepts and principles of green tourism consumption and believe they are more wise to do so are more likely to engage in green tourism consumption.

Table 1 The path coefficient table of the structural equation model.

Hypothesis	Path	Standardized Path Coefficient	SE	CR	P
H1✓	EK→EA	0.432	0.069	6.235	***
H2✓	EA→GTCI	0.424	0.079	5.359	***
H3✓	EK→GTCI	0.429	0.081	5.275	***

***p<0.001, **p<0.01, *p<0.05.

4.2.2 Test of mediation effect

In order to further test the mediating path between environmental knowledge and tourists' green consumption intention, this study uses the Bootstrap interval method to test the significance of the mediating effect. The Percentile 95% CI interval of the path "environmental knowledge→environmental awareness→green tourism consumption intention" is 0.084-0.228, which does not include 0. The indirect effect of the Percentile 95% CI interval also excludes 0, indicating that the mediating effect is established. The hypothesis H4 has been established.

4.2.3 Moderating effect test

This study uses green information presentation as a moderating variable to examine its moderating effect on environmental knowledge and environmental awareness. The interaction between environmental knowledge and green information presentation positively influences environmental awareness ($\beta=0.212$, $P<0.01$, 95%CI=[0.13,0.29]), suggesting that green information presentation enhances the relationship between environmental knowledge and environmental awareness.

The moderated mediation model is verified in this study using the process plug-in in SPSS software, and the indirect relationship between environmental knowledge, environmental awareness, and green tourist consumption willingness varies depending on the degree of green information presentation. According to the results, the indirect effect is 0.17, 95% CI = [0.098, 0.252] excludes 0, which is significant when the level of green information presentation is high; it is 0.106, 95% CI = [0.058, 0.162] excludes 0, which is significant when the level of green information presentation is medium; and it is 0.041, 95% CI = [0.40, 1.42] excludes 0, which is not significant when the level of green information presentation is low.

As a result, H5 is validated and the moderated mediation effect is present.

Secondly, we examined the moderating role of destination image on the relationship between environmental awareness and green tourism consumption intention. Our analysis revealed that the interaction between environmental awareness and destination image significantly and positively influenced green tourism consumption intention ($\beta=0.168$, $P < 0.01$, 95% CI = [0.05, 0.28]). This indicates that destination image positively moderates the relationship between environmental awareness and green tourism consumption intention. Subsequently, we further investigated the moderating role of destination image within the indirect effect of environmental knowledge on green tourism consumption intention via environmental awareness, using the PROCESS macro in SPSS. Our analysis revealed a significant moderated mediation effect, providing support for Hypothesis 6. The indirect effect was consistently significant across all tested levels of destination image. At a high level of destination image, the indirect effect was substantial ($\beta=0.167$, 95% CI = [0.098, 0.252]), with the confidence interval excluding zero. Similarly, with a moderate level of destination image, the indirect effect remained significant ($\beta=0.118$, 95% CI = [0.062, 0.176]), also excluding zero. Even at a low level of destination image, the indirect effect was still significant ($\beta=0.068$, 95% CI = [0.000, 1.124]), with the confidence interval just excluding zero. These findings confirm the presence of a moderated mediation effect, indicating that while the indirect pathway from environmental knowledge to green tourism consumption intention through environmental awareness is robust, its strength is influenced by the perceived quality of the destination image.

5 Discussion and conclusions

First, consumers' environmental knowledge and environmental awareness have a significant positive impact on green tourism consumption intention. And the impact of environmental knowledge on green tourism consumption intention is higher than that of environmental awareness on green tourism consumption intention. Environmental awareness is a complex interaction of cognition and emotion that can effectively transform environmental knowledge into specific behavioral intentions, which is consistent with the results of existing studies (e.g., He et al., 2022). Therefore, cultivating and strengthening environmental awareness is a critical step in effectively transforming environmental knowledge into tangible green consumption actions. Second, environmental awareness plays a mediating role in the path of environmental knowledge affecting green tourism consumption intention. Furthermore, this study confirms that environmental knowledge is a key antecedent to green tourism consumption intention and that environmental awareness partially mediates this relationship. Third, the image of tourist destinations and green information presentation have a significant moderating effect on the path of environmental knowledge affecting green tourism consumption intention. For example, when the image of tourist destinations is good and there is more green presentation information, their environmental awareness will be effectively stimulated, thereby enhancing their green consumption intention.

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